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10/540,638	06/23/2005	Yasuhiro Yamakoshi	OGOSH34USA	5367

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EXAMINER	
VELASQUEZ, VANESSA T	
ART UNIT	**PAPER NUMBER**
1793	
MAIL DATE	**DELIVERY MODE**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,638	YAMAKOSHI, YASUHIRO	
	Examiner	Art Unit	
	Vanessa Velasquez	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,11-24,29 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,11-24,29 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1, 2, 11-24, 29, and 30 are pending. Claims 3-10 and 25-28 are canceled.

Status of Previous Objections

The previous objection to the specification regarding the typographical error on page 3 (line 22) is withdrawn in view of Applicant's amendment to the specification.

The previous objection to Claims 1 and 2 regarding the term "residual" is withdrawn in view of Applicant's amendments to the claims.

Status of Previous Rejections

The previous rejections of Claims 1 and 2 under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363) are withdrawn in view of Applicant's amendments and arguments.

The previous rejections of Claims 11-14 and 18-21 under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363) in view of Shindo et al. (US 6,485,542) are withdrawn in view of Applicant's amendments.

The previous rejections of Claims 15-17 under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363) in view of Herzer (*IEEE Transactions on*

Magnetics, vol. 26, No. 5, September 1990) are withdrawn in view of Applicant's amendments.

The previous rejections of Claims 22-24 under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363) in view of Shindo et al. (US 6,485,542) and further in view of Herzer (*IEEE Transactions on Magnetics*, vol. 26, No. 5, September 1990) are withdrawn in view of Applicant's amendments.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536).

Regarding Claims 1 and 2, US '966 teaches a substrate comprising nickel and at most 15 atomic percent of a Group VB metal (US '966, col. 10, ln. 17-21). Tantalum is a Group VB metal. The overlap between the ranges of the prior art and the claimed ranges is sufficient to establish a *prima facie* case of obviousness (MPEP § 2144.05 Section I).

Still regarding Claims 1 and 2 and concerning the sputtering target limitation, US '966 is silent as to using the substrate disclosed therein as a sputtering target. However, US '536 teaches that alloys comprising nickel and tantalum may be used as sputtering targets (US '536, col. 2, ln. 48-59). Therefore, it would have been obvious to

one of ordinary skill in the art at the time of the invention to utilize the substrate of US '966 as a sputtering target because such alloys are capable of producing magnetic films with large magnetic permeabilities and magnetic flux densities (US '536, col. 3, ln. 51-54).

Still regarding Claims 1 and 2 and concerning the gate electrode limitation, the phrase "for gate electrode" is intended use and will not be accorded patentable weight.

Claims 11-14 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536), and further in view of Shindo et al. (US 6,485,542).

Regarding Claims 11, 12, 18, and 19, US '966 in view of US '536 are silent as to the impurity levels in the alloy. However, US '542, also drawn to a sputtering target, teaches that impurities interfere with the corrosion resistance of the material and should therefore be suppressed (US '542, col. 1, ln. 52-57). More specifically, the total metal impurities should be at most 50 ppm (US '542, col. 1, ln. 66-67 to col. 2, ln. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to decrease the impurity levels of the nickel-tantalum substrate of US '966 in view of US '536 to the levels taught by US '542 because high-purity sputtering targets are less susceptible to corrosion and exhibit enhanced magnetic properties (US '542, col. 2, ln. 60-63).

Regarding Claims 13, 14, 20, and 21, US '542 further teaches that the following elements should be present in the following amounts (US '542, col. 2, ln. 50-59):

Oxygen	≤ 10 ppm (preferable)
Nitrogen	≤ 1 ppm (preferable)
Hydrogen	≤ 0.5 ppm (preferable)
Carbon	≤ 10 ppm (preferable)

US ‘542 makes clear that impurities in amounts exceeding the upper bounds of the aforementioned ranges are undesirable, as they contribute to decreased corrosion resistance (US '542, col. 2, ln. 60-63).

Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536), with evidence from Herzer (*IEEE Transactions on Magnetics*, vol. 26, No. 5, September 1990).

Regarding Claims 15 and 16, US ‘966 in view of US ‘536 are silent as to the magnetic permeabilities of a nickel-tantalum alloy. However, the magnetic permeability can be modified to a desired value by varying annealing temperature, as evidenced by Herzer, who studied how annealing temperature affects the magnetic permeability of a ferromagnetic material (Herzer, FIG. 2). Therefore, it would have been obvious to one of ordinary skill in the art to apply a heat treatment to the nickel-tantalum alloy in order to obtain a material with a desired permeability. Naturally, a high magnetic permeability is desired, especially in the manufacture of magnetic recording devices.

Regarding Claim 17, grain size is a direct result of processing steps, as evidenced by Herzer, wherein the nanocrystallinity of the magnetic material is a result of annealing (Abstract). Thus, it would have been obvious to one of ordinary skill in the art

at the time of the invention to apply a processing step (e.g., heat treatment, mechanical deformation) that would alter the grain size of the nickel-tantalum alloy because modifying the grain size of a material would inherently modify its mechanical properties. Naturally, smaller grains are more desirable as they produce stronger materials.

Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536), and further in view of Shindo et al. (US 6,485,542), with evidence from Herzer (*IEEE Transactions on Magnetics*, vol. 26, No. 5, September 1990).

Regarding Claims 22 and 23, US '966 in view of US '536 and US '542 are silent as to the magnetic permeabilities of a nickel-tantalum alloy. However, the magnetic permeability can be modified to a desired value by varying annealing temperature, as evidenced by Herzer, who studied how annealing temperature affects the magnetic permeability of a ferromagnetic material (Herzer, FIG. 2). Therefore, it would have been obvious to one of ordinary skill in the art to apply a heat treatment to the nickel-tantalum alloy in order to obtain a material with a desired permeability. Naturally, a high magnetic permeability is desired, especially in the manufacture of magnetic recording devices.

Regarding Claim 24, grain size is a direct result of processing steps, as evidenced by Herzer, wherein the nanocrystallinity of the magnetic material is a result of annealing (Abstract). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply a processing step (e.g., heat treatment, mechanical

deformation) that would alter the grain size of the nickel-tantalum alloy because modifying the grain size of a material would inherently modify its mechanical properties. Naturally, smaller grains are more desirable as they produce stronger materials.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536), and further in view of Shindo et al. (US 6,485,542) and Shindo et al. (US 5,667,665), with evidence from Herzer (*IEEE Transactions on Magnetics*, vol. 26, No. 5, September 1990).

Regarding Claim 29, US '966 in view of US '536 and US '542 are silent as to the level of iron impurity content. US '665, however, is drawn to a method of making a high-purity metal for a sputtering target (US '665, col. 1, ln. 6-8). In one aspect of US '665, a highly pure cobalt material is produced, in which amounts of "heavy metals" such as iron, nickel, and cobalt are minimized to prevent discontinuity in the performance of electrical devices (US '665, col. 1, ln. 39-41). Specifically, the amount of iron is preferably at most 1 ppm (US '665, Abstract). Although US '665 is drawn to cobalt, it would have been obvious to one of ordinary skill in the art to extend the **general teaching** of minimizing heavy metal impurities, as exemplified by US '665, to the nickel-tantalum alloy of US '966 in view of US '536 and US '542 because maintaining the purity of the sputtering target ensures that any product formed from the target (e.g., electrodes) also remains pure. The purity of an electrode is especially important in the fabrication of high-performance devices.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goyal et al. (US 5,964,966) in view of Ichihara et al. (US 6,033,536), and further in view of Shindo et al. (US 5,667,665).

Regarding Claim 30, US '966 in view of US '536 are silent as to the level of iron impurity content. US '665, however, is drawn to a method of making a high-purity metal for a sputtering target (US '665, col. 1, ln. 6-8). In one aspect of US '665, a highly pure cobalt material is produced, in which amounts of "heavy metals" such as iron, nickel, and cobalt are minimized to prevent discontinuity in the performance of electrical devices (US '665, col. 1, ln. 39-41). Specifically, the amount of iron is preferably at most 1 ppm (US '665, Abstract). Although US '665 is drawn to cobalt, it would have been obvious to one of ordinary skill in the art to extend the **general teaching** of minimizing heavy metal impurities, as exemplified by US '665, to the nickel-tantalum alloy of US '966 in view of US '536 and US '542 because maintaining the purity of the sputtering target ensures that any product formed from the target (e.g., electrodes) also remains pure. The purity of an electrode is especially important in the fabrication of high-performance devices.

Response to Arguments

Applicant's arguments with respect to Claims 1, 2, and 11-24 have been considered but are moot in view of the new grounds of rejection. However, the Examiner wishes to further clarify the context in which the secondary prior art references were used.

First, Applicant argues that the Shindo reference (US 6,485,542) requires iron. While the sputtering target disclosed therein is a nickel-iron target, the reference is relied upon to teach the concept that impurities (e.g., oxygen, nitrogen, hydrogen, carbon) have deleterious effects on the ability of such a material to resist corrosion and maintain good magnetic properties. The Examiner wishes to point out that the sputtering target of US '542 is primarily nickel. Therefore, it would be expected that the aforementioned impurities would affect a high-purity nickel target in substantially the same manner as it would a nickel-iron target. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to suppress impurities in a high-purity nickel target to ensure that the target maintains good corrosion resistance and magnetic properties.

Second, Applicant argues that the Herzer reference (*IEEE Transactions on Magnetics*, vol. 26, No. 5, September 1990) focuses on an iron composition that does not contain any nickel. The Examiner wishes to clarify that the Herzer reference is relied upon to teach a general principle regarding how heat treatment affects the grain size and magnetic permeability of a ferromagnetic material. Although the heat treatment disclosed is specific to the alloy of studied by Herzer, the associated effects (e.g., modification of grain size and magnetic permeability) would be expected by one of ordinary skill in the art to occur in other ferromagnetic materials such as nickel. The ferromagnetic elements belong to the same group in the periodic table and would thus be expected to possess like chemical and physical properties.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is (571)270-3587. The examiner can normally be reached on Monday-Friday 8:30 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
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/Vanessa Velasquez/
Examiner, Art Unit 1793